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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/870,260

05/30/2001

Jyri Hamalainen

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12/20/2004

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EXAMINER

GREY, CHRISTOPHER

ART UNIT

PAPER NUMBER

2667

DATE MAILED: 12/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. **A**

09/870,260

Applicant(s)

HAMALAINEN ET AL.

Examiner

Christopher P Grey

Art Unit

2667

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al (US 6771706) in view of Hammons Jr. et al. (US 6678263)

Claim 1, 15 Ling et al. (Ling 'hereinafter') discloses within a communication system, a transmitter unit capable of transmitting data to a receiver unit through a number of channels (locations). Ling discloses an encoder within the transmitter unit that receives and encodes the incoming encoded bits (Col 6 lines 34-49). Ling discloses each channel being independently encoded based on different coding rates (Col 7 lines 27-54). Ling discloses information being received at the encoder pertaining to the coding rate (Col 6 lines 1-19). Ling does not disclose the encoder being a space-time encoder.

Hammons Jr. et al. (Hammons 'hereinafter') discloses an invention aimed at providing full spatial diversity, whereby in a communication system, a transmitting unit containing a space-time encoder (element 96 in fig 3), is capable of transmitting data to a receiving unit through a number of possible channels/locations (see Fig 3 and Col 8 lines 3-29)

It would have been obvious to one of the ordinary skill in the art at the time of the invention to employ the communication system aimed at providing deleterious path

effects as disclosed by Ling, with the space time encoder of Hammons invention. The motivation for the combination of these teaching is to provide full spatial diversity for an arbitrary number of transmit antennas (Col 1 lines 18-22) and reduce channel fading.

Claim 2, 16 Ling discloses a number of fractional rates as discloses in Col 7 lines 27-54 and Table 1. The motivation is the same as that for claims 1 and 15, and furthermore the combination improves the likelihood of correctly receiving a transmitted signal and performance (Ling Col 1 lines 31-42).

Claim 3 Ling discloses a communication system being based on a number of different modulation techniques (Col 1 lines 16-23). Ling also discloses different channel being selected for transmission based on different combination of modulation schemes and coding rates as disclosed in Col 7 lines 27-54).

The motivation is the same as that for claim 1 and furthermore the combination improves the likelihood of correctly receiving a transmitted signal and performance (Ling Col 1 lines 31-42).

Claim 4, 17 Ling discloses a radio frequency modulated signal being transmitted (Col 1 lines 24-30). Ling also discloses multiple transmit antennas for data transmission (Col 1 lines 43-51)

The motivation is the same as that for claims 1 and 15, and furthermore the combination improves the likelihood of correctly receiving a transmitted signal and performance (Ling Col 1 lines 31-42).

Claim 5, 18 Ling discloses each channel being encoded with an independent code (Col 6 lines 50- Col 7 line 10). Ling discloses a channel interleaver (element 204 in fig 2

and Col 6 lines 34-49) for interleaving the code bits (for successive transmission). Ling also discloses data of different modulation schemes and coding rates (Col 7 lines 27-54) being sent through different channels (locations)

The motivation is the same as that for claims 1 and 15, and furthermore the combination improves the likelihood of correctly receiving a transmitted signal and performance (Ling Col 1 lines 31-42).

Claim 6, 19 Ling discloses each channel being encoded with an independent code (Col 6 lines 50- Col 7 line 10). The motivation is the same as that for claim 5 and 18

Claim 7 Ling does not disclose trellis encoded burst portions encoded pursuant to a trellis encoding technique. However, Hammons discloses a trellis encoding technique (Col 8 lines 3-27). The motivation is the same as that for claim 5

Claim 8 Ling discloses preconditioned modulation symbols (index) as disclosed in Col 8 lines 54-60). Ling also discloses a number of subchannels (disclosed in Col 8 lines 1-15). The motivation is the same as that for claim 5

Claim 9 Ling does not disclosed the formation of an eight state space time code. However, Hammons discloses an eight state space time code (disclosed in Col 33 lines 1-25). The motivation is the same as that for claim 5

Claim 10, 20 Ling discloses a receiver unit (element 150 in fig 1) for receiving the data communicated upon the channel subsequent to the encoding by the transmitter (element 110 in Fig 1). The receiver unit contains a data processor that detects and decodes the data complementary to the encoding performed in the transmitter (Col 5 lines 47-67). Ling does not disclose a space time decoder.

Hammons discloses a space-time channel decoder (element 106 in fig 3 and Col 7 lines 51-Col 8 line 2). The motivation is the same as that for claim 1 and 15.

Claim 11 Ling discloses a data processor within the receiver that deinterleaves (allows for cumulative metric decoding) bit values and decodes the deinterleaved values (Col 5 lines 47-67). The motivation is the same as that for claim 1.

Claim 12 Ling discloses a channel coefficient matrix (disclosed in Col 13 lines 5-21 and Col 14 lines 40-65). The motivation is the same as that for claim 1.

Claim 13 Ling discloses the receiver system including a number of antennas for reception of the transmitted signal (Col 5 lines 47-67). The motivation is the same as that for claim 1.

Claim 14 Ling discloses the channel noise/distortion being identically distributed (disclosed in Col 13 lines 37-62). The motivation is the same as that for claim 1

Conclusion

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

(a) Seshadri (US 5479448) discloses a method/apparatus for providing antenna diversity. Seshadri discloses an encoder used to generate codewords, and these codewords are transmitted via different antennas.

(b) Calderbank et al. discloses a method/ apparatus for increasing the data rate and providing antenna diversity using multiple transmit antennas. Seshadri discloses an

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encoder used to generate codewords, and these codewords being transmitted on different channels.

(c) Ionescu (US 6741658) discloses a method/ apparatus operable in a communication system by which trellis coding is implemented in an encoder within a sending station. Ionescu also teaches codewords being transmitted on a channel, and provides space and time diversity.

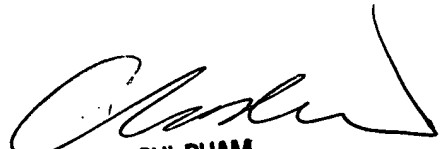
3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P Grey whose telephone number is (571)272-3160. The examiner can normally be reached on 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571)272-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher Grey
Examiner
Art unit 2667

C. Grey
13/13/04


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